Complete Summary

GUIDELINE TITLE

Hyperacute stroke management. Neurovascular imaging. In: Canadian best practice recommendations for stroke care.

BIBLIOGRAPHIC SOURCE(S)

Lindsay P, Bayley M, Hellings C, Hill M, Woodbury E, Phillips S. Hyperacute stroke management. Neurovascular imaging. In: Canadian best practice recommendations for stroke care. CMAJ 2008 Dec 2;179(12 Suppl):E37-9.

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates previous versions: Acute stroke management. Brain imaging. In: Canadian best practice recommendations for stroke care: 2006. Ottawa (ON): Canadian Stroke Network, Heart & Stroke Foundation of Canada; 2006. p. 46-8.

Acute stroke management. Carotid artery imaging. In: Canadian best practice recommendations for stroke care: 2006. Ottawa (ON): Canadian Stroke Network, Heart & Stroke Foundation of Canada; 2006. p. 54-5.

The Canadian Best Practice Recommendations for Stroke Care include an ongoing plan to formally update the recommendations every 2 years to ensure that the best practice recommendations remain current and are coordinated with other similar initiatives nationally and internationally.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Acute stroke, including ischemic and hemorrhagic stroke

GUIDELINE CATEGORY

Diagnosis
Evaluation

CLINICAL SPECIALTY

Critical Care
Emergency Medicine
Family Practice
Geriatrics
Internal Medicine
Neurology
Nuclear Medicine
Nursing
Pediatrics

INTENDED USERS

Advanced Practice Nurses
Allied Health Personnel
Emergency Medical Technicians/Paramedics
Health Care Providers
Hospitals
Nurses
Patients
Physician Assistants
Physicians
Utilization Management

GUIDELINE OBJECTIVE(S)

To provide a synthesis of best practices in stroke care across the continuum of care and serve as a framework for Canadian provinces and territories as they develop and implement stroke strategies

TARGET POPULATION

All patients with suspected stroke or transient ischemic attack

INTERVENTIONS AND PRACTICES CONSIDERED

Evaluation

Neurovascular imaging may include the following:

1. Computed tomography scan
2. Magnetic resonance angiography with diffusion-weighted sequences and fluid-attenuated inversion recovery
3. Catheter angiography
4. Duplex ultrasonography
5. Magnetic resonance imaging
6. Diffusion-weighted sequences
7. Gradient echo and fluid-attenuated inversion recovery (FLAIR) sequences

MAJOR OUTCOMES CONSIDERED

- Definitive diagnosis of stroke
- Diagnosis of carotid artery disease

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Hand-searches of Published Literature (Primary Sources)
Hand-searches of Published Literature (Secondary Sources)
Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Identification of Key Topics and Core Reference Guidelines

Key Activities Undertaken

- Since the release of the 2006 edition of the stroke guidelines, a literature scan has been conducted every 2 to 3 months to review emerging evidence and new or updated guidelines.
- An extensive literature scan of primary research evidence was conducted.
- A detailed literature search for existing international stroke-related guidelines was also undertaken.
- A set of high-quality stroke-related guidelines was selected to serve as core reference guidelines, on the basis of their ratings from the Appraisal of Guidelines Research and Evaluation tool, particularly the "rigour of development" domain score, and their relevance to the Canadian context.
- A content review of the core reference guidelines was conducted to identify a list of stroke topic areas that were addressed in these guidelines and were supported by the highest levels of evidence. A secondary list of stroke topic areas that had lower levels of evidence but that were considered to be key system drivers (such as acute diagnostic imaging with computed tomography scans) was also identified. The findings were compiled into a matrix to allow easy comparison of international recommendations by topic.
- The project manager conducted structured literature reviews for each stroke topic area, focusing on meta-analyses, systematic reviews, randomized trials, quasi-experimental studies, other related guidelines and reports, and Canadian consensus statements by health care professional groups.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Expert Consensus
Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Grade	Criteria
A	Strong recommendation. Evidence from randomized controlled trials or meta-analyses of randomized controlled trials. Desirable effects clearly outweigh undesirable effects, or vice versa.
B	Single randomized controlled trial or well-designed observational study with strong evidence; or well-designed cohort or case–control analytic study; or multiple time series or dramatic results of uncontrolled experiment. Desirable effects closely balanced with undesirable effects.
C	At least one well-designed, nonexperimental descriptive study (e.g., comparative studies, correlation studies, case studies) or expert committee reports, opinions and/or experience of respected authorities, including consensus from development and/or reviewer groups.

Based on Guyatt GH, Cook DJ, Jaeschke R, et al. Grades of recommendation for antithrombotic agents: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th edition). [published erratum in *Chest* 2008;34:47]. *Chest* 2008;133(6 Suppl):123S-131S.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

The Appraisal of Guidelines Research and Evaluation (AGREE) tool was used to appraise the quality of stroke-related guidelines identified.

The strength of the available evidence was graded using a standardized scoring system. Each guideline group applied a validated grading system for determining the strength of the evidence used to develop the guideline, and overall, several different grading systems were used. The level of evidence for each recommendation in the Canadian Best Practice Recommendations for Stroke Care appears at the end of the recommendation statement.

Guidelines identified and appraised as part of the Canadian Stroke Quality of Care Study (CSQCS) and the Stroke Canada Optimization of Rehabilitation through

Evidence (SCORE) project were not reappraised; rather than duplicate the work of those 2 projects, the already-established scores were accepted for this process.

Each recommendation in the 2008 update of the Canadian Best Practice Recommendations for Stroke Care was evaluated against several criteria: the strength of the available research evidence to support the recommendation, the degree to which the recommendation drives system change or processes of care delivery, and the overall validity and relevance as a core recommendation for stroke care across the continuum.

The levels of evidence were determined through a structured ranking system that measured the strength of the results in a clinical trial or research study. The design of the study (such as a case report for an individual patient or a randomized double-blind controlled clinical trial) and the end points measured (such as survival or quality of life) affect the strength of the evidence.

The various types of study designs, in descending order of strength, include the following:

- Randomized controlled clinical trials (double-blinded or non-blinded): This is considered the gold standard of study design.
- Meta-analyses of randomized studies: Such analyses offer a quantitative synthesis of previously conducted studies. The strength of evidence from a meta-analysis is based on the quality of the conduct of individual studies. Meta-analyses of randomized studies are placed in the same category of strength of evidence as are randomized studies.
- Nonrandomized controlled clinical trials.
- Case series: Population-based, consecutive series, consecutive cases (not population-based) or nonconsecutive cases. These clinical experiences are the weakest form of study design, but often they are the only information available.

Several rating systems have been used by guideline developers internationally to evaluate the strength of the evidence for their recommendations. These systems vary in the nomenclature used (alphabetical versus numeric), but there is usually reasonable equivalence in the definitions across the levels of evidence. Each best practice recommendation included in this document provides the level of evidence for the recommendation, and cites the core reference guideline(s) that was adapted or that contributed most to the wording of the recommendation (see Table 1 in the original guideline document for definitions of abbreviations used for this purpose). Refer to the master reference list in the original guideline document for a detailed list, including website addresses, of the core reference guidelines.

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus (Consensus Development Conference)
Other

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Development and Update Process

The conceptual framework used to guide the identification, selection, development and updating of the Canadian best practice recommendations was the Practice Guideline Evaluation and Adaptation Cycle of Graham and colleagues. This cycle involves a number of steps that are integral to the guideline development process:

1. Establishing an interdisciplinary guideline development team
2. Establishing a guideline appraisal process using a validated tool
3. Systematic searching for existing practice guidelines
4. Appraising the quality, currency and content of guideline recommendations
5. Adopting or adapting guidelines for local use
6. Obtaining external expert feedback on the proposed recommendations
7. Selecting final recommendations
8. Obtaining official endorsement
9. Establishing an ongoing review and update process

The methodology for the Canadian Best Practice Recommendations for Stroke Care developed in 2006 was based on this framework, and it continues to be followed, with additional enhancements, for subsequent updates. The key activities undertaken in the guideline development process are highlighted below.

Leadership

The guideline development process was led by a subgroup of the Best Practices and Standards Working Group and managed by the performance and standards specialist from the Canadian Stroke Network. An interprofessional group of experts in stroke care was identified to participate on task groups convened specifically to draft the Canadian recommendation statements for each segment of the continuum of stroke care. Task groups included members of the Best Practices and Standards Working Group and other recognized experts from across Canada, including stroke neurologists, physiatrists, nurses, emergency physicians, paramedics, physiotherapists, occupational therapists, dietitians, speech–language pathologists, pharmacists, stroke survivors, education experts and professionals from other disciplines as required to ensure that all relevant health disciplines for a particular topic area were represented in the development of the recommendations. A national consensus panel was convened to provide further input into the recommendations. An external group of stroke and methods experts conducted a final review of the recommendations before release.

Participants in the guideline development and review process were asked to declare all potential conflicts of interest in writing. Sixteen people had received honoraria to speak about stroke. None of these conflicts were deemed to prevent unbiased participation in the guideline process. This project was funded in its entirety by the Canadian Stroke Strategy, a partnership of the Canadian Stroke Network and the Heart and Stroke Foundation of Canada (both nonprofit organizations). The recommendations were achieved by consensus of independent experts and stakeholders through a rigorous process, and the views and interests of the funding body have not influenced the final recommendations.

Identification of Key Topics and Core Reference Guidelines

Criteria were established to guide the selection of best practice recommendations for the Canadian stroke guideline. These were applied to the original recommendations and all updates. It was determined that, to be considered for inclusion, recommendations had to meet the following criteria:

- Be supported by the highest levels of evidence and/or be considered essential to delivering best practice in stroke care
- Be integral to driving important health system change
- Be aligned with other stroke-related Canadian best practice recommendations (e.g., the management of hypertension, diabetes and dyslipidemia)
- In their totality, reflect the full continuum of stroke care

It was agreed that all recommendations would be accompanied by specific information to support implementation (i.e., the rationale for the recommendation, key health system implications, standardized performance measures to evaluate implementation and a summary of the supporting evidence).

Initially, the scope and content of the project was defined by evaluating existing national and international stroke guidelines and recommendations to determine which topics should be considered for inclusion in the Canadian stroke best practice recommendations. Two comprehensive Canadian stroke care guideline reviews that were already available, the Canadian Stroke Quality of Care Study (CSQCS), which focused on acute care, telestroke and secondary prevention, and the Stroke Canada Optimization of Rehabilitation through Evidence project (SCORE), which focused on specific rehabilitation components, were used as a starting point. These studies of best practices and performance measurement in stroke care flowed from 5 Canadian consensus panels (3 for the Canadian Stroke Quality of Care Study, 1 for the Stroke Canada Optimization of Rehabilitation through Evidence project and 1 joint) conducted from 2004 to 2006. The rigorous methodology and detailed findings of these 2 projects formed the foundation for the initial phase of development of the stroke best practices recommendations.

Synthesis of Best Practice Recommendations

For each segment of the continuum of stroke care (prevention, hyperacute and acute care, rehabilitation and community care), expert task groups were convened to select relevant recommendations from the matrix or, if necessary, draft new recommendations based on the literature reviews. Task groups were instructed that recommendations could address structure and/or processes of care at either the system level or the patient level, and that they could be taken as direct statements from other existing guidelines, adapted from one or more guidelines, or written by the task group. See Appendix 2 in the original guideline document for task group participant lists. At the end of each recommendation statement, we have listed other guidelines with which these recommendations are most strongly aligned, where appropriate and relevant (see Table 1 in the original guideline document for the abbreviations of guideline titles or developers used in these lists).

Most of the task group work was done by teleconference, with the project leader and/or the project manager joining all teleconferences to ensure consistency, standardization and rigour of development across groups. (See section E3 of the

original guideline document for more information on the recommendation development process.)

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Not applicable

COST ANALYSIS

Published cost analyses were reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

National Expert Consensus Panel Review of Recommendations

After the task groups completed their work, the draft recommendations and supporting information were presented for discussion and decision-making to a broad group of stakeholders at a national consensus panel meeting. Panel participants included task group members, health care professionals from across disciplines and across the health care continuum who were external to the guideline development process, key opinion leaders and stroke survivors.

Through breakout sessions and full panel meetings, discussion and debate took place with respect to relevance, current evidence and practice, and barriers to uptake and implementation of each proposed recommendation. Finally, a decision was made for each recommendation as to whether to approve it, reject it or defer it for further investigation by the task groups.

Release of Best Practice Recommendations

Following the consensus panel meeting, the task groups reconvened to review the consensus panel feedback, address suggested revisions and propose final wording for the recommendations. Once that process was completed, the following steps were undertaken:

- The recommendations and supporting documentation were reviewed externally by a range of Canadian stroke experts and system leaders who had not participated in any previous step of the guideline development process.
- The document was translated into French and the translation was verified by bilingual stroke neurologists and stroke nurses.
- Monitoring and feedback mechanisms were put in place to continue preparation for the next update.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions of the levels of evidence (A-C) are provided at the end of the "Major Recommendations" field.

Note from the Canadian Stroke Network/Heart & Stroke Foundation of Canada and the National Guideline Clearinghouse (NGC): The *Canadian Best Practice Recommendations for Stroke Care*, 2008 update, has been divided into individual summaries. In addition to the current summary, the following are available:

- Public awareness and patient education. Public awareness and responsiveness.
- Public awareness and patient education. Patient and family education.
- Prevention of stroke. Life style and risk factor management.
- Prevention of stroke. Blood pressure management.
- Prevention of stroke. Lipid-management.
- Prevention of stroke. Diabetes management.
- Prevention of stroke. Antiplatelet therapy.
- Prevention of stroke. Antithrombotic therapy in atrial fibrillation.
- Prevention of stroke. Carotid intervention.
- Hyperacute stroke management. Emergency medical services management of acute stroke patients.
- Hyperacute stroke management. Acute management of transient ischemic attack and minor stroke.
- Hyperacute stroke management. Blood glucose abnormalities.
- Hyperacute stroke management. Acute thrombolytic therapy.
- Hyperacute stroke management. Acute aspirin (ASA) therapy.
- Hyperacute stroke management. Management of subarachnoid and intracerebral hemorrhage.
- Acute inpatient stroke care. Stroke unit care.
- Acute inpatient stroke care. Components of acute inpatient stroke care.
- Stroke rehabilitation and community reintegration. Initial stroke rehabilitation assessment.
- Stroke rehabilitation and community reintegration. Provision of inpatient stroke rehabilitation.
- Stroke rehabilitation and community reintegration. Components of inpatient stroke rehabilitation.
- Stroke rehabilitation and community reintegration. Outpatient and community-based rehabilitation.
- Stroke rehabilitation and community reintegration. Follow-up and community reintegration.
- Selected topics in stroke management. Dysphagia assessment.
- Selected topics in stroke management. Identification and management of post-stroke depression.
- Selected topics in stroke management. Vascular cognitive impairment and dementia.
- Selected topics in stroke management. Shoulder pain assessment and treatment.

Highlights of the 2008 Update: revisions to existing best practice recommendations

- Updates and minor edits were proposed and approved for 21 of the original 24 best practice recommendations.
- The recommendations on computed tomography (CT) scanning and carotid imaging were combined into 1 recommendation on neurovascular imaging.
- The recommendation on acute thrombolysis was substantially revised in light of late-breaking evidence.
- The recommendation addressing community rehabilitation was refocused to include both outpatient and community rehabilitation services.

Hyperacute Stroke Management

Note: This recommendation on neurovascular imaging has been developed by combining 2 separate recommendations from the 2006 edition of Canadian Best Practice Recommendations for Stroke Care: brain imaging and carotid imaging.

Best Practice Recommendation: Neurovascular Imaging

All patients with suspected acute stroke or transient ischemic attack should undergo brain imaging immediately [**Evidence Level A**] (Adams et al., 2007; Sacco et al., 2006; Goldstein et al., 2006; Broderick et al., 2007; Duncan et al., 2005; Lindsay et al., "Canadian Stroke Quality of Care Study [CSQCS]: establishing indicators," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for telestroke," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for stroke," 2005; Bayley et al., 2006).

1. In most instances, the initial modality of choice is a noncontrast computed tomography (CT) scan [**Evidence Level B**] (Adams et al., 2007; Sacco et al., 2006; Goldstein et al., 2006; Broderick et al., 2007; Duncan et al., 2005; Lindsay et al., "Canadian Stroke Quality of Care Study [CSQCS]: establishing indicators," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for telestroke," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for stroke," 2005; Bayley et al., 2006).
2. Vascular imaging should be done as soon as possible to better understand the cause of the stroke event and guide management decisions. Vascular imaging may include CT angiography, magnetic resonance angiography, catheter angiography and duplex ultrasonography [**Evidence Level B**] (Adams et al., 2007; Sacco et al., 2006; Goldstein et al., 2006; Broderick et al., 2007; Duncan et al., 2005).
3. If MRI is performed, it should include diffusion-weighted sequences to detect ischemia and gradient echo and fluid-attenuated inversion recovery (FLAIR) sequences to determine extent of infarct or presence of hemorrhage [**Evidence Level B**] (Lindsay et al., "Canadian Stroke Quality of Care Study [CSQCS]: establishing indicators," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for telestroke," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for stroke," 2005; Bayley et al., 2006;Â New Zealand Guidelines Group,Â 2003; Intercollegiate Stroke Working Party, 2008).

4. In children, if the initial CT is negative, magnetic resonance imaging (MRI) should be performed to assist with diagnosis and management plans [**Evidence Level B**] (Roach et al., 2008).
5. Carotid imaging should be performed within 24 hours of a carotid territory transient ischemic attack or nondisabling ischemic stroke (if not done as part of the original assessment) unless the patient is clearly not a candidate for carotid endarterectomy [**Evidence Level B**] (Lindsay et al., "Canadian Stroke Quality of Care Study [CSQCS]: establishing indicators," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for telestroke," 2005; Lindsay et al., "CSQCS: quality indicators and literature review for stroke," 2005; Bayley et al., 2006;Â Scottish Intercollegiate Guidelines Network [SIGN],Â 1997).
6. In pediatric cases, cerebral and cervical arteries should be imaged as soon as possible, preferably within 24 hours [**Evidence Level C**] (Roach et al., 2008).

Rationale

Clinicians disagree on the clinical diagnosis of stroke (vs. not stroke) in about 20% of patients. It is impossible to differentiate infarct from hemorrhage by clinical examination alone. Brain imaging is required to guide management, including the selection of acute, time-sensitive interventions. In a decision-analysis model, a policy of "scan all immediately" was more cost-effective than "scan all within 48 hours" or "scan patients on anticoagulants or in a life-threatening condition immediately and the rest within 14 days." In pediatric cases 12% have dissections and should be on anticoagulants rather than (ASA) aspirin, and therefore imaging is required to guide these management decisions.

Symptomatic carotid artery stenosis is a known modifiable risk factor for stroke. Therefore, patients who may be suitable for carotid endarterectomy should have rapid access to noninvasive imaging of the carotid arteries. Noninvasive imaging typically comprises Doppler ultrasound, followed (if necessary) by magnetic resonance angiography or CT angiography. Recent meta-analyses of individual patient data have demonstrated that the timing of endarterectomy is of paramount importance. For patients with moderate (50%–69%) stenosis, statistically significant benefit from carotid endarterectomy cannot be demonstrated if surgery is delayed by more than 4 weeks after symptom onset. For patients with severe (> 70%) stenosis, statistically significant benefit from carotid endarterectomy cannot be demonstrated if surgery is delayed by more than 12 weeks after symptom onset.

Definitions:

Levels of Evidence*

Grade	Criteria
A	Strong recommendation. Evidence from randomized controlled trials or meta-analyses of randomized controlled trials. Desirable effects clearly outweigh undesirable effects, or vice versa.
B	Single randomized controlled trial or well-designed observational study with strong evidence; or well-designed cohort or case–control analytic study; or

Grade	Criteria
	multiple time series or dramatic results of uncontrolled experiment. Desirable effects closely balanced with undesirable effects.
C	At least one well-designed, nonexperimental descriptive study (e.g., comparative studies, correlation studies, case studies) or expert committee reports, opinions and/or experience of respected authorities, including consensus from development and/or reviewer groups.

*Based on Guyatt GH, Cook DJ, Jaeschke R, et al. Grades of recommendation for antithrombotic agents: American College of Chest Physicians Evidence-Based Clinical Practice Guidelines (8th edition). [published erratum in *Chest* 2008;34:47]. *Chest* 2008;133(6 Suppl):123S-131S.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence is specifically stated for each recommendation.

This document is the result of an extensive review of international stroke research and published evidence-based best practice recommendationsÂ or guidelines related to stroke.

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate neurovascular imaging in patients with stroke to enable the selection of acute time-sensitive interventions

POTENTIAL HARMS

Not stated

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

It is recognized that resource issues (human, financial and system) may make it difficult to implement every recommendation and performance measure in this document.Â However, they are presented as "gold standard" benchmarks toward

which all organizations and systems managing stroke patients should be striving. Additionally, they are valuable tools that can be used by those advocating for improved stroke care services.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

Dissemination and Implementation

Networking

Several dissemination strategies for the best practice recommendations were identified and implemented following the initial release in 2006. Many of these are ongoing.

- Consultation with research experts in the field of knowledge translation and guideline implementation across Canada and internationally to identify and utilize evidence-based implementation strategies.
- Sharing progress with all Canadian Stroke Strategy working groups to ensure alignment and collaboration in dissemination.
- Presentation to and discussion with provincial stroke champions during draft stages of development and preparation of final content.
- Consultation with other national guideline groups in related fields (e.g., hypertension, dyslipidemia, diabetes).
- Presentation for discussion at meetings of health care professionals across health care disciplines and across the continuum of stroke care, at the national, provincial and regional levels.
- Presentation to front-line health care professionals at the local level and using local consensus processes to review and provide structured assessment of the enablers and barriers to guideline implementation, as well as innovative implementation strategies.
- Posting the recommendations on the Canadian Stroke Strategy website, as well as other central guideline repository websites.
- Direct mail-out to key stakeholders and front-line health care professionals working with persons with stroke and their families along the continuum of care.
- Highlights of individual recommendations in stroke-related newsletters, such as the National Stroke Nursing Council's newsletter.
- Structured feedback mechanism included in mailings and on the Canadian Stroke Strategy website.

Tools to Support Implementation of Best Practice Recommendations

The national professional development and training platform of the Canadian Stroke Strategy focuses on implementation of a professional development and training plan for health professionals caring for stroke patients. The Professional Development and Training Working Group has developed a 3-pronged approach encompassing pre-professional education, professional development and systems change. This working group conducted a national needs assessment and identified

a need for point-of-care tools to facilitate knowledge transfer of stroke best practice recommendations to and within the clinical setting.

System Implications

- Health promotion efforts that contribute to the primary prevention of stroke in all communities (integrated with existing chronic disease prevention initiatives).
- Public awareness initiatives focusing on the signs and symptoms of stroke and the sudden nature of the onset of these signs and symptoms.
- Enhanced public education on the warning signs of stroke with a stronger emphasis on the appropriate response when the signs and symptoms of stroke are recognized
- Training and education for emergency medical services, physicians and nurses to increase ability to recognize potential stroke patients and provide rapid assessment and management.
- Heightened emergency response with appropriate protocols.

See original guideline document for Performance Measures.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Foreign Language Translations
Patient Resources
Resources

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better

IOM DOMAIN

Effectiveness
Patient-centeredness
Timeliness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Lindsay P, Bayley M, Hellings C, Hill M, Woodbury E, Phillips S. Hyperacute stroke management. Neurovascular imaging. In: Canadian best practice recommendations for stroke care. CMAJ 2008 Dec 2;179(12 Suppl):E37-9.

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2006 (revised 2008 Dec)

GUIDELINE DEVELOPER(S)

Canadian Stroke Network - Disease Specific Society
Heart and Stroke Foundation of Canada - Disease Specific Society

SOURCE(S) OF FUNDING

Canadian Stroke Strategy

Networks of Centres of Excellence program

GUIDELINE COMMITTEE

Canadian Stroke Strategy Best Practices and Standards Working Group

COMPOSITION OF GROUP THAT AUTHORED THE GUIDELINE

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**Members of the Best Practices and Standards Writing Group.*

FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Sixteen participants in the guideline development and review process have received research grants and/or honoraria related to stroke. None of the declared conflicts were deemed to prevent unbiased participation in the guideline process. See Appendix 1, Appendix 2, Appendix 3, Appendix 4 in the original guideline document for complete statements of competing interests.

ENDORSER(S)

World Stroke Organization - International Agency

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates previous versions: Acute stroke management. Brain imaging. In: Canadian best practice recommendations for stroke care: 2006. Ottawa (ON): Canadian Stroke Network, Heart & Stroke Foundation of Canada; 2006. p. 46-8.

Acute stroke management. Carotid artery imaging. In: Canadian best practice recommendations for stroke care: 2006. Ottawa (ON): Canadian Stroke Network, Heart & Stroke Foundation of Canada; 2006. p. 54-5.

The Canadian Best Practice Recommendations for Stroke Care include an ongoing plan to formally update the recommendations every 2 years to ensure that the best practice recommendations remain current and are coordinated with other similar initiatives nationally and internationally.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the Canadian Stroke Strategy Web site.

Print copies: Available from The Canadian Stroke Strategy, 451 Smyth Road, Room 3105, Ottawa, Ontario K1H 8M5.

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- Lindsay P, Bayley M, Hellings C, Hill M, Woodbury E, Phillips S. Canadian best practice recommendations for stroke care: summary. CMAJ 2008 Dec 2;179(12 Suppl): S1-S25. Electronic copies: Available in English and French in Portable Document Format (PDF) from the Canadian Stroke Strategy Web site.
- Canadian Stroke Strategy performance measurement manual: a supplement to the Canadian best practice recommendations for stroke care. 2007 May. 35 p. Electronic copies: Available in Portable Document Format (PDF) from the Canadian Stroke Strategy Web site.
- Best practice recommendations and performance measures. A supplement to the Canadian Best Practice Recommendations for Stroke Care. 2008 Dec. 32 p. Electronic copies: Available in Portable Document Format (PDF) from the Canadian Stroke Strategy Web site.

Print copies: Available from The Canadian Stroke Strategy, 451 Smyth Road, Room 3105, Ottawa, Ontario; K1H 8M5.

See the Canadian Stroke Strategy Web site for additional resources.

PATIENT RESOURCES

The following are available:

- A patient's guide to Canadian best practice recommendations for stroke care. 2009. 6 p. Electronic copies: Available in Portable Document Format (PDF) from the Canadian Stroke Strategy Web site.
- Getting on with the rest of your life after stroke: a guide for patients and their families. 32 p. Electronic copies: Available in Portable Document Format (PDF) from the Canadian Stroke Strategy Web site.

Additionally, a variety of patient information resources, including a list of stroke warning signs, is available from the Heart & Stroke Foundation of Canada Web site.

Please note: This patient information is intended to provide health professionals with information to share with their patients to help them better understand their health and their diagnosed disorders. By providing access to this patient information, it is not the intention of NGC to provide specific medical advice for particular patients. Rather we urge patients and their representatives to review this material and then to consult with a licensed health professional for evaluation of treatment options suitable for them as well as for diagnosis and answers to their personal medical questions. This patient information has been derived and prepared from a guideline for health care professionals included on NGC by the authors or publishers of that original guideline. The patient information is not reviewed by NGC to establish whether or not it accurately reflects the original guideline's content.

NGC STATUS

This NGC summary was completed by ECRI Institute on July 14, 2008. The information was verified by the guideline developer on August 27, 2008. This NGC summary was updated by ECRI Institute on December 1, 2009.

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